

WHAT IS CLAIMED IS:

1. A desiccant package useable for protecting highly moisture-sensitive electronic devices sealed within an enclosure, comprising:
 - a) a moisture-permeable container which can be positioned in the sealed enclosure;
 - b) solid water absorbing particles of one or more materials disposed in the moisture-permeable container;
 - c) said solid water absorbing particles including solid particles of one or more materials, at least one of such materials having an average particle size range 0.001 to 0.1 micrometers to provide a high rate of water absorption and to provide an equilibrium minimum humidity level lower than a humidity level to which the device is sensitive within the sealed enclosure; and
 - d) said moisture-permeable container essentially maintains the moisture absorption rate of the solid water absorbing particles contained therein, the moisture-permeable container acting to separate the solid water absorbing particles from the highly moisture-sensitive device.
2. The desiccant package in accordance with claim 1 wherein one or more of the materials of the solid water absorbing particles are selected from the group consisting of alkaline metal oxides, alkaline earth metal oxides, sulfates, metal halides, perchlorates and metals with work functions less than 4.5 eV and capable of being oxidized in the presence of moisture, or combinations thereof.
3. The desiccant package in accordance with claim 1 which provides a humidity level less than 2500 ppm.
4. The desiccant package in accordance with claim 1 which provides a humidity level less than 100 ppm.

5. A desiccant package useable for protecting highly moisture-sensitive electronic devices sealed within an enclosure, comprising:

a) solid water absorbing particles of one or more materials in a moisture-permeable binder;

b) said solid water absorbing particles including solid particles of one or more materials, at least one of such materials having an average particle size range 0.001 to 0.1 micrometers to provide a high rate of water absorption and to provide an equilibrium minimum humidity level lower than a humidity level to which the device is sensitive within the sealed enclosure; and

c) said binder being adapted to essentially maintain or enhance the moisture absorption rate of the solid water absorbing particles contained therein, the binder being in solid or liquid phase or dissolved in a liquid.

6. The desiccant package in accordance with claim 5 wherein one or more of the materials of the solid water absorbing particles are selected from the group consisting of alkaline metal oxides, alkaline earth metal oxides, sulfates, metal halides, perchlorates and metals with work functions less than 4.5 eV and capable of being oxidized in the presence of moisture, or combinations thereof.

7. The desiccant package in accordance with claim 5 wherein the binder is selected from the group consisting of cellulose acetates, epoxies, phenoxies, siloxanes, methacrylates, sulfones, phthalates, and amides or combinations thereof.

8. The desiccant package in accordance with claim 5 wherein the solid water absorbing particles comprise 10 wt% to 90 wt% of the solid water absorbing particles and the binder.

9. The desiccant package in accordance with claim 5 which provides a humidity level less than 2500 ppm.

10. The desiccant package in accordance with claim 5 which provides a humidity level less than 100 ppm.

11. The desiccant package in accordance with claim 5 wherein water vapor transmission rate of the binder is greater than 3.5 gm-mil/100 in²/day.

12. The desiccant package in accordance with claim 5 wherein the binder is radiation curable.

13. The desiccant package in accordance with claim 5 wherein the binder is radiation-curable photoresist compositions.

14. The desiccant package in accordance with claim 5 wherein the binder is selected from the group consisting of acrylates, methacrylates, cyclized polyisoprenes, polyvinyl cinnamates, epoxies, silicones, and adhesives or combinations thereof.

15. A desiccant useable for protecting highly moisture-sensitive electronic devices sealed within an enclosure, comprising:

- a) solid water absorbing particles of one or more materials in a moisture-permeable binder on a support;
- b) said solid water absorbing particles including solid particles of one or more materials, at least one of such materials having an average particle size range 0.001 to 0.1 micrometers to provide a high rate of water absorption and to provide an equilibrium minimum humidity level lower than a humidity level to which the device is sensitive within the sealed enclosure; and

c) said binder being adapted to reduce degradation of or enhance the moisture absorption rate of the solid water absorbing particles contained therein, the binder being in solid or liquid phase or dissolved in a liquid.

16. The desiccant in accordance with claim 15 wherein one or more of the materials of the solid water absorbing particles are selected from the group consisting of alkaline metal oxides, alkaline earth metal oxides, sulfates, metal halides, perchlorates and metals with work functions less than 4.5 eV and capable of being oxidized in the presence of moisture, or combinations thereof.

17. The desiccant in accordance with claim 15 wherein the binder is selected from the group consisting of cellulose acetates, epoxies, phenoxies, siloxanes, methacrylates, sulfones, phthalates, and amides or combinations thereof.

18. The desiccant in accordance with claim 15 wherein the solid water absorbing particles comprise 10 wt% to 90 wt% of the solid water absorbing particles and the binder.

19. The desiccant in accordance with claim 15 which provides a humidity level less than 2500 ppm.

20. The desiccant in accordance with claim 15 which provides a humidity level less than 100 ppm.

21. The desiccant in accordance with claim 15 wherein water vapor transmission rate of the binder is greater than 3.5 gm-mil/100 in²/day.

22. The desiccant in accordance with claim 15 wherein the binder is radiation curable.

23. The desiccant in accordance with claim 15 wherein the binder is radiation-curable photoresist compositions.

24. The desiccant in accordance with claim 15 wherein the binder is selected from the group consisting of acrylates, methacrylates, cyclized polyisoprenes, polyvinyl cinnamates, epoxies, silicones, and adhesives or combinations thereof.

25. A desiccant, comprising material including at least in part solid particles of one or more materials, at least one of such materials having an average particle size range 0.001 to 0.1 micrometers to provide a high rate of water absorption and to provide an equilibrium minimum humidity level lower than a humidity level to which a highly moisture sensitive electronic device is sensitive within a sealed enclosure.

26. The desiccant of claim 25 wherein the material includes a binder adapted to reduce degradation of or enhance the moisture absorption rate of the solid water absorbing particles contained therein, the binder being in solid or liquid phase or dissolved in a liquid.

27. The desiccant of claim 25 wherein one or more of the materials of the solid water absorbing particles are selected from the group consisting of alkaline metal oxides, alkaline earth metal oxides, sulfates, metal halides, perchlorates and metals with work functions less than 4.5 eV and capable of being oxidized in the presence of moisture, or combinations thereof.

28. The desiccant in accordance with claim 26 wherein the binder is selected from the group consisting of cellulose acetates, epoxies,

phenoxies, siloxanes, methacrylates, sulfones, phthalates, and amides or combinations thereof.

29. The desiccant in accordance with claim 26 wherein the solid water absorbing particles comprise 10 wt% to 90 wt% of the solid water absorbing particles and the binder.

30. The desiccant in accordance with claim 25 which provides a humidity level less than 2500 ppm.

31. The desiccant in accordance with claim 25 which provides a humidity level less than 100 ppm.

32. The desiccant in accordance with claim 26 wherein water vapor transmission rate of the binder is greater than 3.5 gm-mil/100 in²/day.

33. The desiccant in accordance with claim 26 wherein the binder is radiation curable.

34. The desiccant in accordance with claim 26 wherein the binder is radiation-curable photoresist compositions.

35. The desiccant in accordance with claim 26 wherein the binder is selected from the group consisting of acrylates, methacrylates, cyclized polyisoprenes, polyvinyl cinnamates, epoxies, silicones, and adhesives or combinations thereof.